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CLAIMS

1. An isolated and purified nucleic acid molecule encoding a *Haemophilus influenzae* adhesin (Hia) protein of a strain of *Haemophilus influenzae* having:
- (a) a DNA sequence selected from the group consisting of those shown in Figures 18, 20, 21, 22, 23, 24 and 25 (SEQ ID Nos: 23, 27, 29, 31, 33, 35, 37); or
 - (b) a DNA sequence encoding a *Haemophilus influenzae* adhesin (Hia) protein having an amino acid sequence selected from the group consisting of those shown in Figures 18, 20, 21, 22, 23, 24 and 25 (SEQ ID Nos: 24, 28, 30, 32, 34, 36, 38).
2. An isolated and purified nucleic acid molecule encoding an N-truncated *Haemophilus influenzae* adhesin (Hia) protein of a strain of *Haemophilus influenzae* which is amplifiable by a pair of nucleotides which are selected from the group consisting of:
- SEQ ID No: 7 and SEQ ID No: 15
 - SEQ ID No: 9 and SEQ ID No: 15
 - SEQ ID No: 11 and SEQ ID No: 15
 - SEQ ID No: 13 and SEQ ID No: 15
 - SEQ ID No: 55 and SEQ ID No: 57
3. An isolated and purified nucleic acid encoding an N-truncated *Haemophilus influenzae* adhesin (Hia) protein of a strain of *Haemophilus influenzae* expressed as inclusion bodies, said N-truncated protein having the ability to bind to human epithelial cells.
4. The nucleic acid molecule of claim 3 which encodes a truncated Hia protein selected from the group consisting of the E21, T33, V38 and N52 truncations of *Haemophilus influenzae* strain 11 and the V38 truncation of *Haemophilus influenzae* strain 33.
5. A vector for transforming a host comprising the nucleic acid molecule of claim 1.
6. A vector for transforming a host comprising the nucleic acid molecule of any one of claims 2 to 4.
7. The vector of claim 5 or 6 which is a plasmid vector.
8. The vector of claim 7 wherein said plasmid vector has the identifying characteristics of a plasmid which is selected from the group consisting of:

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DS-2008-2-3 as shown in Figure 1A
DS-2188-1-1 as shown in Figure 5A
DS-2201-1 as shown in Figure 5A
DS-2188-2-1 as shown in Figure 5A
DS-2188-2-6 as shown in Figure 5A
IA-191-3-1 as shown in Figure 32

9. A vector for transforming a host, comprising a nucleic acid molecule encoding a full-length *Haemophilus Influenzae* adhesin (Hia) protein as claimed in claim 1 or N-truncated *Haemophilus Influenzae* adhesin (Hia) protein as claimed in any one of claims 2 to 4 and a promoter operatively connected to said nucleic acid molecule for expression of said full-length or truncated Hia protein.

10. The vector of claim 9 further comprising the *cer* gene of *E. coli*.

11. The vector of claim 9 which is a plasmid vector.

12. The vector of claim 11 wherein said plasmid vector has the identifying characteristics of a plasmid vector which is selected from the group consisting of:

BK-98-2-11 as shown in Figure 6A
DS-2242-1 as shown in Figure 7A
DS-2242-2 as shown in Figure 7A
DS-2340-2-3 as shown in Figure 8A
DS-2447-2 as shown in Figure 9A
DS-2448-17 as shown in Figure 9B
JB-2930-3 as shown in Figure 32

13. A host cell transformed by a vector as claimed in claim 5, 8 or 9 and expressing a protective *Haemophilus Influenzae* adhesin (Hia) protein of a non-typeable strain of *Haemophilus*.

14. The host cell of claim 13 which is a strain of *E. coli*.

15. A recombinant protective *Haemophilus Influenzae* adhesin (Hia) protein of a strain of *Haemophilus Influenzae* producible by the transformed *E. coli* of claim 14 or an immunogenic fragment thereof.

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16. An immunogenic composition, comprising at least one immunologically-active component selected from the group consisting of:

(A) an isolated and purified nucleic acid molecule encoding a *Haemophilus influenzae* adhesin (Hia) protein of a strain of *Haemophilus influenzae* having:

(a) a DNA sequence selected from the group consisting of those shown in Figures 18, 20, 21, 22, 23, 24 and 25 (SEQ ID Nos: 23, 27, 29, 31, 33, 35, 37); or

(b) a DNA sequence encoding a *Haemophilus influenzae* adhesin (Hia) protein having an amino acid sequence selected from the group consisting of those shown in Figures 18, 20, 21, 22, 23, 24 and 25 (SEQ ID Nos: 24, 28, 30, 32, 34, 36, 38);

(B) an isolated and purified nucleic acid molecule encoding an N-truncated *Haemophilus influenzae* adhesin (Hia) protein of a strain of *Haemophilus influenzae* which is amplifiable by a pair of nucleotides which are selected from the group consisting of:

SEQ ID No: 7 and SEQ ID No: 15

SEQ ID No: 9 and SEQ ID No: 15

SEQ ID No: 11 and SEQ ID No: 15

SEQ ID No: 13 and SEQ ID No: 15

SEQ ID No: 55 and SEQ ID No: 57;

(C) an isolated and purified nucleic acid molecule encoding a truncated *Haemophilus influenzae* adhesin (Hia) protein of a strain of *Haemophilus influenzae* expressed as inclusion bodies, said N-truncated protein having the ability to bind to human epithelial cells; and

(D) a recombinant protective *Haemophilus influenzae* adhesin (Hia) protein of a strain of *Haemophilus influenzae* producible by a strain of *E. coli* transformed by an expression vector as claimed in claim 5, 6 or 9; and a pharmaceutically-acceptable carrier therefor.

17. The immunogenic composition of claim 16 formulated as a vaccine for *in vivo* administration to protect against disease caused by *Haemophilus*.

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18. The immunogenic composition of claim 16 in combination with a targeting molecule for delivery to specific cells of the immune system or to mucosal surfaces.
19. The immunogenic composition of claim 16 formulated as a microparticle, capsule or liposome preparation.
20. The immunogenic composition of claim 16 further comprising an adjuvant.
21. A method for inducing protection against disease caused by *Haemophilus*, comprising administering to a susceptible host an effective amount of the immunogenic composition of claim 16.
22. The method of claim 21 wherein the susceptible host is a human.
23. A method for the production of a protective *Haemophilus influenzae* adhesin (Hia) protein of a non-typeable strain of *Haemophilus influenzae*, which comprises:
- transforming a host with a vector as claimed in claim 6,
 - growing the host cell to express the encoded truncated Hia, and
 - isolating and purifying the expressed Hia protein.
24. The method of claim 23 wherein the host cell is *E. coli*.
25. The method of claim 23 wherein said encoded truncated Hia is expressed in inclusion bodies.
26. The method of claim 25 wherein said isolation and purification of the expressed Hia is effected by:
- disrupting the grown transformed cells to produce a supernatant and the inclusion bodies,
 - solubilizing the inclusion bodies to produce a solution of the recombinant Hia,
 - chromatographically purifying the solution of recombinant Hia free from cell debris, and
 - isolating the purified recombinant Hia protein.
27. The method of claim 23 wherein said non-typeable strain of *Haemophilus* is selected from the group consisting of strains 11, 33, 32, 29, M4071, K9, K22 and 12.

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28. The method of claim 23 wherein said vector includes the T7 promoter and said *E. coli* is cultured in the presence of an inducing amount of lactose.

29. A pair of nucleotide sequences capable of amplifying and generating a nucleic acid molecule encoding an N-truncated *Haemophilus Influenzae* adhesin (Hia) protein of a strain of *Haemophilus Influenzae*, which pair of nucleotides is selected from the group consisting of:

SEQ ID No: 7 and SEQ ID No: 15

SEQ ID No: 9 and SEQ ID No: 15

SEQ ID No: 11 and SEQ ID No: 15

SEQ ID No: 13 and SEQ ID No: 15

SEQ ID No: 55 and SEQ ID No: 57

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